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THE CONTRIBUTIONS OF PSYCHOLOGICAL THEORY AND EDUCATIONAL RESEARCH TO THE TEACHING OF FOREIGN LANGUAGES.

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THIS ADDRESS, GIVEN AT THE INTERNATIONAL CONFERENCE ON MODERN FOREIGN LANGUAGE TEACHING (BERLIN, SEPTEMBER 1964), PRESENTS A GENERAL DISCUSSION OF THE PRESENT SCOPE, ROLE, AND POTENTIAL USE OF RESEARCH IN FOREIGN LANGUAGE TEACHING METHODOLOGY, AND MAINTAINS THAT THE BEST RESEARCH IS THAT WHICH IS CLOSELY ALLIED WITH THEORY, AND THE HARDEST TO APPLY IS THAT WHICH HAS DIRECT BEARING ON CLASSROOM PROCEDURE. IT POINTS OUT THE GREAT SCOPE FOR DEVELOPMENT IN THE THEORY OF FOREIGN LANGUAGE LEARNING, CITING FAVORABLY THE WORK OF MATHEMATICAL LEARNING THEORISTS WHO HAVE DEVISED EXACT EQUATIONS FOR THE RATE AT WHICH MATERIAL IS LEARNED OR FORGOTTEN. THE NEED OF FORMING AN ACCURATE THEORETICAL COMPARISON BETWEEN THE "AUDIO-LINGUAL HABIT" AND "COGNITIVE CODE-LEARNING" THEORIES IS DISCUSSED, SUCH EXPERIMENTS BEING DIFFICULT TO CONTROL SINCE IT IS ALMOST IMPOSSIBLE TO PREDICT THE EXACT TECHNIQUES A STUDENT WILL EMPLOY, AND SINCE THE THEORETICAL CONTRAST HAS NOT BEEN SUFFICIENTLY WELL-CONCEIVED. NEITHER METHOD IS BASED ON MODERN THEORIES OF THE PSYCHOLOGY OF LANGUAGE LEARNING, AND THE DISCUSSION CONCLUDES WITH A CRITICAL COMPARISON OF THE TWO, RECOMMENDING A JOINING OF AUDIO-LINGUAL TECHNIQUE WITH SOME OF THE BETTER ELEMENTS OF COGNITIVE CODE-LEARNING THEORY. THIS ARTICLE IS A REPRINT FROM THE "MODERN LANGUAGE JOURNAL," VOLUME 49, NUMBER 5, MAY 1965, PAGES 273-281. (RW)

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*The Contributions of Psychological Theory and Educational Research to the Teaching of Foreign Languages**

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AT AN international congress where many new developments and new ideas are brought forth, it is appropriate also to think about the role of research and theory not only in guiding these new developments and new ideas, but also in providing a sound basis for foreign language teaching in all its aspects. This paper will concern research and theory specifically in the psychological foundations of foreign language teaching; it will not treat the role of linguistic theory in this field.

We shall have to treat research and theory somewhat separately, for on the one hand, certain kinds of research do not depend much on theory, and on the other, some kinds of theories are extremely difficult to test by any empirical research. But as I hope to show, the best research is based on theory and interacts with it, and the best theories are those that can be tested by empirical research.

Research is widely held to be a "good thing." Many industries allocate a certain percentage of their budgets to the support of research laboratories, and they generally find this an extremely rewarding thing to do. It has been proposed that education should imitate industry in this regard; the amount of money devoted to education in most advanced countries is so large that even a very small percentage of the educational budget should yield fairly large sums for educational research. Several countries, most notably the United States of America and the Soviet Union, have established extensive programs for research in education. The Soviet Union has set up a series of research institutes for various aspects of education and these institutes are turning out interesting and useful research reports as well as materials of instruction. In the United States, most educational research is performed by persons attached to the colleges and universities, and a very large proportion of it is now supported by government funds. We may take note of such programs as those of the United States Office of Education. Among these, the Cooperative Research Program supplies funds for educational research, both basic and applied, at all levels of the educational system, and for all kinds of problems and subject matters. Under the National Defense Education Act, there are two further programs of support for educational research: the so-called Title VII program, specially aimed at supporting research on the use of "new" media such as films, television, and programmed instruction, and, of special interest here, the Title VI program, which in addition to providing funds for the development of foreign language teaching materials and the training of teachers of foreign languages, also makes funds available for fundamental research in the theory and methodology of foreign language teaching. Although the funds from Title VI first became available nearly five years ago, there has been disappointingly little use of them for basic research in foreign language teaching methodology, primarily because of the shortage of qualified and interested research workers in this field. I will, however, be able to cite several significant studies that have come out of this program.

At the same time, skepticism has been voiced in some quarters about the possibility of doing research that can make a significant difference in the conduct of foreign language programs. One complaint is that research is often so abstract or so removed from the realities of the classroom that it would be difficult to apply the results in any practical way. Another variety of complaint

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is that even if the research is closely tied to real-life, classroom situations, the variables are often so difficult to control that one hesitates to draw generalizations from the results. There is admittedly some basis for these complaints, but a deeper examination of the issues raised may lead us to the conclusion that valid and significant educational research in foreign language teaching is nevertheless possible.

Potential "Consumers" of Research Results

One way of getting at the problem of the role of research in foreign language teaching is to consider who are the potential "consumers" of research results. For our purposes, I would identify four types of consumers: teachers, teacher trainers, educational policy makers, and authors of instructional materials.

Consider first the teacher, who is, after all, at the heart of the educational process. There are various ways in which teachers respond to findings from educational research, largely depending upon their personalities, attitudinal systems, experience, and training. There is, of course, the stand-pat traditionalist who is quite sure that he is doing the best that can be done and wants no intrusion of research findings to disturb the fine techniques he has already developed. For all we know, many of these traditionalists are quite justified in their stand; others may be simply in a rut, consistently producing poorer results than they might be able to produce if they were to take account of research outcomes and newly developed materials. At the opposite extreme from the stand-pat traditionalist is the impressionable adventurer who will "try anything," particularly if it is the latest fad or fashion. A special subtype of impressionable adventurer is the "gadgeteer," the teacher who has an insatiable thirst for gadgets and other kinds of hardware, phonographs, tape recorders, hi-fi speaker systems, teaching machines, and the like. Somewhere in between these extremes I hope we find the majority of teachers, teachers who have convictions about the soundness of their teaching techniques but are open-minded and interested in new ideas, materials and techniques that stem from research and development, with a readiness to try out these techniques in their own classrooms. The fruits of research that are easiest to apply in the classroom are of course the texts, films, teaching machine programs, and other materials that already incorporate and embody the findings of research. Next in order come the gadgets and other pieces of equipment that are provided to render these teaching materials more accessible to the student. Another kind of research outcome immediately and directly applicable in the classroom would be one which indicates what kind of text or teaching material is most effective for a certain purpose, for the teacher has only to choose to use that text or teaching material (assuming, of course, that he has the power and the means to choose). For example, research indicating the usefulness of particular types of audiovisual materials obviously has implications for the teacher. The kind of research result that is hardest for the classroom teacher to apply, or even to understand, in many cases, is the one that demonstrates the effectiveness of a certain teaching *procedure* that must be carried out in some consistent manner by the teacher in the moment-to-moment conduct of a teaching session. For example, if research says, as it seems to, that an efficacious procedure for the teaching of pronunciation is the "shaping" by gradual approximation of behavior according to the principles worked out by the psychologist B. F. Skinner, the teacher must not only thoroughly understand these principles and how to apply them, but also be able to carry out the procedures effectively in the classroom. Often teachers find it rather difficult to change their behavior on the basis of research findings, even when the procedure is exceedingly simple and obvious. For instance, although I do not know of any research that directly implies this, I believe that a good principle to follow in carrying out any teaching routine in which one wants to call on successive pupils is not to call on them systematically in a set pattern, but to do so more or less randomly, so that pupils will maintain themselves in a state of alertness to be called on at any time. Yet I understand that efforts to get teachers to change from a systematic to a random calling procedure have sometimes met with failure, apparently because teachers are unable to change their characteristic modes of classroom behavior.

This leads us to the conclusion that *trainers* of teachers of foreign languages should be avid consumers of educational research insofar as it

yields information on what kinds of teaching procedures are most effective, or desirable in other respects, because the best hope of getting teachers to learn to use these methods is at the point at which they are first trained to teach. We should remind ourselves that it is not only research specifically directed at modern foreign language teaching that teacher trainers need to know about, but also the whole gamut of research on teacher behavior. This has been summarized in the recently published *Handbook of Research on Teaching*,[1] and it has also been presented in various texts on educational psychology. For example, the teacher trainer should be mindful of research on the personality of teachers and its effect on classroom learning. One of the most well-established findings of educational research is that a major source of variation in pupil learning is the teacher's ability to promote that learning. Exactly what this ability consists of is not certain, but there is strong evidence that along with knowledge of subject matter there is involved the teacher's ability to organize this content and to present it with due regard for the pupil's ability and readiness to acquire it.

Another consumer of research is the educational policy maker. Of course, many people may contribute to the making of educational policy. In the United States, educational policy can be made at almost any level from the classroom teacher, the school superintendent, the school board, or even the United States Congress. Comparable situations exist in other countries. At whatever level, the maker of educational policy needs facts of various sorts on which to base his decisions. In the field of foreign language teaching, the educational policy maker needs to have facts about such questions as: What is the optimum age at which the study of a foreign language is most effectively begun? How long should foreign language instruction last in order to give the student a solid mastery of the language being taught? Is it best to spread out this instruction rather thinly over a number of years, or is it best to give the instruction intensively? Should there be any selection of who is to be given foreign language instruction, and if so, how should the pupils be selected? It has seemed to me[2] that one of the prime functions of educational research is to supply information of this sort to educational policy makers.

One other type of consumer of educational research is the person who has to do with the preparation of teaching materials, whether he is the author of a text, the producer of a film, the originator of a teaching machine program, or what not. He needs research results concerning the content and optimal organization of materials of instruction. The textbook writer who is careful to seek out the answers to such questions and then applies them competently in developing his material is rare indeed. There is a real problem in organizing and communicating the results of research in such a way that they will be readily understood and readily applicable by this kind of consumer. Despite an enormous amount of research in the United States of America and elsewhere on improving the instructional characteristics of films, for example, the producers of educational films have in general failed to capitalize on these findings.

Reseacher-Consumer Linkage

These remarks point up the problem of the linkage between the researcher and the consumer of research. How is the researcher going to communicate with the consumer of his research? Does he even know what his audience is and what his audience wants? We are all familiar with the fact that the researcher most typically publishes his result in some journal article that few of the potential consumers even know about, let alone have time to read or act upon. It is difficult for the researcher to reach his audience even through a teacher's convention such as this, because of the competition for time and the fact that only a small fraction of the potential audience is able to attend such meetings.

I can pass on to you one suggestion for solution of this problem. It is not original with me; indeed, it has been discussed in many circles previously. The idea actually comes out of the history of American agriculture—the idea of the county agent—the person who by personal visitation communicates the findings of agricultural research (better seeds, better insecticides, better

[1] N. L. Gage, Ed., *Handbook of research on teaching*. Chicago: Rand McNally and Co., 1963.

[2] John B. Carroll, "Wanted: a research basis for educational policy on foreign language teaching," *Harvard Educational Review*, Vol. XXX, No. 2 (Spring, 1960), pp. 128–140.

methods of crop rotation, etc.) to the farmer right at his door. There could be an analogue of the county agent in education, the individual who makes a specialty of communicating the findings of research to the potential consumer, i.e., the teacher, teacher trainer, educational policy maker, or preparer of instructional material. We have had a few instances in the United States of people who have functioned like county agents in going around to help schools install and use language laboratories. The idea could be extended to include specialists in other aspects of research and development. The major problem that would be encountered, at least in the United States, is the shortage of persons qualified to do this kind of educational liaison. The existing personnel are too much needed either as teachers or as researchers. Another problem that might be encountered, embarrassingly enough, is that the results of research and development might not be thought clear and definite enough to provide the would-be educational change agent with a solid product to sell. That is to say, I am not sure that educational research in the teaching of foreign languages has come up with ideas, principles, and materials that are as well established as those the agricultural county agent has to communicate to the farmers on his rounds. But this is a matter that I wish to consider further in the remainder of this discussion.

A moment ago I alluded in passing to the kinds of research "products" that might be utilized by the consumer of research. A further consideration reveals that these products lie along a continuum from the most tangible to the most intangible. Among the tangible products are the substantive materials like books, films, tests, teaching machines, and so forth that have the findings of educational research "built in" as it were, ready for use, just as a refrigerator embodies the results of the latest research in the science of refrigeration. Among the intangibles are ideas and principles that remain in the abstract until they are applied, actualized, or acted upon by a skillful educator. This continuum corresponds to another that differentiates the researcher whose main concern is with immediately practical problems from one whose efforts are directed mainly toward understanding the kind of behavior he is dealing with. On the one hand we have the researcher who wants to find a better way of teaching, who seeks to find the immediate cause of students' errors and difficulties, who wants to demonstrate the usefulness of a new technique, or who wants to find the correct basis for reaching some particular practical decision. On the other hand, we have the researcher who is trying to build a science of learning, who would like to make precise predictions about the effects of a given teaching procedure, or who would be most pleased to confirm or deny a particular theory of learning. I would like to affirm that there is a place for both types of researchers—in fact, for workers at every point on the spectrum between the intensely practical and the intensely theoretical. It is easy to understand what the practical researcher is doing, not so easy to understand what the theoretical researcher is up to, at least in the area of the behavioral sciences. I suppose that before nuclear fission was discovered there was a suspicious air about what theoretical physicists were up to, but this has been largely dispelled by now. I hope it can become dispelled also in the behavioral sciences. We have already begun to achieve some really startling results from theoretical work in behavioral science, and I believe there will be much more to come.

Gains from Theoretical Research in Learning

Let me cite a brief example of some possible gains that may ensue from theoretical research in learning. One that is often used for this purpose is the research of Skinner with his pigeons: the fact that in the experimental laboratory situation pigeons can be "trained" to almost any stunt or series of stunts by the right "schedule of reinforcements," the reinforcers being rewards for particular movements. There is now considerable doubt as to how this principle can be applied in human learning because it does not always work, and other factors may be operating. Therefore I will try to select an example straight out of human learning. Some of the work of a group of psychologists who call themselves *mathematical learning theorists* will furnish good examples. Recent work by a group at Stanford University suggests that one of the problems encountered in learning is that of converting short time memories into long term ones. Empirically, it is found that items that have once been presented or exposed to a learner for a short time quickly fade from memory, particularly when

many more items are immediately presented. This is true even though the learner may have the impression, each time a new item is presented, that he will never forget it. We are all conscious of having felt this way about some new name, fact, telephone number, or whatever, only to find that a few moments later the material has vanished.

These are common observations; what the mathematical psychologists have been able to do is to propose exact equations for the rate at which material is learned or forgotten. Professor Patrick Suppes[3] of Stanford University is trying to apply these mathematical developments to the resolution of the classical "whole-part" learning problem for the special case of foreign language learning. In his view, the problem is one of the competition between learning and forgetting. If learning occurs faster than forgetting, it is better to put more attention on learning new materials, and thus the "whole method," in which one works over the whole of a list of vocabulary, let us say, is better than the "part method" in which one attacks the list piecemeal. His research is not yet complete; tentative results suggest that actually learning and forgetting occur at about the same rates, and therefore the part and the whole methods are equally effective for the kinds of learning his subjects are doing. This result, however, happens not to agree with other results that suggest that part learning is increasingly efficient as the length of the list or material to be learned gets longer.

Nevertheless, whatever the final result, it is possibly going to be relevant to foreign language learning, because one characteristic of foreign language learning that may differentiate it from many other kinds of learning is the sheer volume of the material to be learned. The foreign language teacher would be well advised to optimize the rate at which new words, phrases, syntactical patterns, and so on, are introduced in the course of learning. Yet sheer empirical, trial-and-error methods of determining the optimal rates at which new material is to be introduced and then reviewed (and revised if necessary) are not enough because the different combinations of possibilities are large in number. Only a mathematical analysis has any real promise of disclosing the true optima. Therefore, I would urge support of theoretical research in learning even though the pay-off may not be seen in any immediately practical outcomes.

Laboratory Research and Classroom Research

Consideration of Professor Suppes' work gives rise to some other remarks about the relation between research in the laboratory and research in the classroom, for the work of Suppes that I have been describing is done exclusively in the laboratory. In his experiment the learner hears a different Russian word and its English equivalent every four or five seconds until the whole of a list of 108 words has been presented; in the next round, the learner is told to try to say the English equivalent before he hears it, and so it goes, round after round, until the learner can anticipate all the correct answers. This kind of vocabulary learning is clearly very different from the kind of vocabulary learning that is typical in the classroom, where every word may be presented with ample meaningful context and a lengthy explanation of etymology or other matters. But Professor Suppes is not claiming that his method of vocabulary learning is superior to any other; I am sure he would admit that it is inferior to the method of vocabulary learning that occurs in most classrooms. But this is irrelevant to the purpose of his experiment, concerned with a quite different set of problems.

The laboratory setting is believed to be necessary to control the many extraneous variables that are inevitable in a classroom experiment; and secondly, it is unlikely that the type of learning activity would change the *pattern* of results. Any results found concerning whole-part learning for the laboratory setting would in all probability have the *pattern* and general form that might also be found in a classroom experiment if this were feasible, but the laboratory experiment is very much cheaper and simpler to carry out. If we can check the impulse to demand that laboratory research imitate the classroom learning setting in *all* respects, and realize that laboratory research usually seeks patterns of relationships among sharply delimited sets of variables, holding all others constant or at least under control, we will be on the road to better

[3] Patrick Suppes, "Modern learning theory and the elementary school curriculum," *American Educational Research Association Journal*, Vol. 1, No. 2 (March, 1964), pp. 79–94.

understanding of the role of research in the behavioral sciences. But we will achieve an even higher degree of comprehension if we realize that the problems attacked in laboratory research, more often than not, stem from theory and the attempt to test particular theories, rather than from practical concerns.

We are at such a really rudimentary stage in the development of theory in the behavioral sciences that there is enormous scope for theoretical developments. This is true not only for learning theory in general, but also for the theory of foreign language learning. That is, we do not yet have either a good general theory concerning the conditions under which learning takes place, nor a general theory of language behavior that would enable us to select optimal components of a foreign language teaching system for any given case. This is not to say that we know nothing about learning. I would hold that we know a good deal about it on a descriptive, functional level, for one can state quite a number of generalizations and principles that, if followed, will help the teacher or learner improve the course of learning. My point is that no proven *theory* now exists to account for all the phenomena we can observe or even the phenomena that we can predict and control. We are in the stage in the history of our science that chemistry was in before molecular theory was well developed.

Major Theories of Foreign Language Learning

The lack of proven theory becomes particularly acute when we try to understand the process of learning a second language. Examination of the practices of foreign language teachers and the writings of several theorists suggests that there are today two major theories of foreign language learning. One may be called the *audio-lingual habit* theory, the other, the *cognitive code-learning* theory. The audio-lingual habit theory, which is more or less the "official" theory of the reform movement in foreign language teaching in the United States of America has the following principal ideas: (1) that since speech is primary and writing is secondary, the habits to be learned must be learned first of all as auditory discrimination responses and speech responses; (2) that habits must be automatized as much as possible so that they can be called forth without conscious attention; (3) that the automatization of habits occurs chiefly by practice, that is, by repetition. The audio-lingual habit theory has given rise to a great many practices in language teaching: the language laboratory, the structural drill, the mimicry-memorization technique, and so forth. The cognitive code-learning theory, on the other hand, may be thought of as a modified, up-to-date grammar-translation theory. According to this theory, learning a language is a process of acquiring conscious control of the phonological, grammatical, and lexical patterns of a second language, largely through study and analysis of these patterns as a body of knowledge. The theory attaches more importance to the learner's understanding of the structure of the foreign language than to his facility in using that structure, since it is believed that, provided the student has a proper degree of cognitive control over the structures of the language, facility will develop automatically with use of the language in meaningful situations.

The opposition between these theories can be illustrated by the way they would deal with the findings of contrastive linguistics. According to the audio-lingual habit theory, information about the differences between the learner's native language and the target language is of use to the teacher in planning drills and exercises, because it would pinpoint the difficulties of the student, but it would confuse the student, who needs only to imitate the foreign language sounds and patterns until by practice he masters them. According to the cognitive code-learning theory, on the other hand, the differences between the native language and the target language should be carefully explained to the student, so that he may acquire conscious control of the target language patterns.

In practice, of course, some teachers act as if they believed in both of these theories, appealing to one of them for some of their teaching procedures and to the other for different aspects. But I would nevertheless insist that the two theories represent rather fundamental differences in teaching method and style that show up in the way textbooks are written and foreign language courses are taught. We need information on which of these theories is a better basis for foreign language teaching.

At this point the would-be researcher has an important strategy decision to make. One course open to him is to conduct a large scale educational experiment in which the results of teaching based on the audio-lingual habit theory are contrasted with teaching based on the cognitive code-learning theory. This kind of research is feasible, but very expensive and difficult to control. The experimental design would call for some method for assuring that the students taught under the two theories are approximately equal in ability and motivation; ideally, students would be randomly assigned to the two methods, but educational realities may make this impossible. Separate and distinct courses and materials of instruction must be created, and the instructors must be trained to adhere closely to a certain style of presentation.

An Experimental Comparison of Two Teaching Methods

This, in fact, was the choice made by a research team at the University of Colorado consisting of a foreign language professor, George Scherer, and a psychologist, Michael Wertheimer. The complete results of this experiment on the teaching of German at the college level are now available in a book just published.[4] The experiment contrasted an audio-lingual method, largely based on the audio-lingual habit theory, with a bilingual, grammar-translation method of the traditional sort, based on some variety of the cognitive code-learning theory I have described above. Random assignment of some 300 students to the two methods was used. The "traditional" group was given reading material right from the start, while the use of reading materials in any form was delayed for twelve weeks in the case of the audio-lingual group. At the end of the first year, the audio-lingual group was significantly better in listening and speaking, and was not far behind the traditional group in tests of straight reading and writing. Unfortunately, in the second year it was not possible to give the two groups differentiated instruction, but even so at the end of the second year the audio-lingual group was still slightly ahead in speaking ability, presumably because of their good early start in this. The traditional group was slightly better in writing ability, but the two groups no longer differed at all in listening and reading. On the whole, the average differences between the groups were small; small enough, at any rate, to suggest that it does not make any material difference whether one uses the audio-lingual method as opposed to the traditional grammar-translation method. We can suppose in this experiment that there was good teaching in both methods, and perhaps this was really the major variable that held both groups up to a fairly high standard.

One is gratified that the Scherer-Wertheimer experiment has been performed even though the results are in a sense disappointing.[5] The dramatic superiority that an ardent audio-lingual habit theorist might have predicted failed to appear. I would make the following comments on this experiment, and my comments are not wholly from hindsight, because I had privately predicted the general pattern of the results. First, it is almost impossible to control the techniques that the *student himself* will adopt to acquire a given skill, particularly over a long course of study. For example, even though the audio-lingual method was presumably "monolingual" (i.e., conducted almost exclusively in German, the target language), many students undoubtedly adopted the strategy of translating the German material into English at every opportunity. Likewise, some students under the bilingual grammar-translation method would have found ways of indulging in audio-lingual practice. Thus the two methods are not as sharply differentiated as they should be in an experiment. Second, it is doubtful that the theoretical bases for the contrasting teaching methods in the experiment were sufficiently well-formed to make for highly contrasting methods of teaching. For example, the notion of audio-lingual habit formation may not have been sufficiently exploited in the audio-lingual group, and the notion of conscious cognitive control does not seem to have been explicitly employed in the grammar-translation group. Further, there was no precise formulation of the relevant theory. Scherer and Wertheimer were merely con-

[4] George A. C. Scherer and Michael Wertheimer, *A psycholinguistic experiment in foreign-language teaching*, New York: McGraw-Hill, Inc., 1964.

[5] This experiment was performed pursuant to a contract between the United States Office of Education and the University of Colorado under the Language Development Program, Title VI, of the National Defense Education Act.

cerned with the general comparison of two widely-used methods of teaching as they understood them. This in itself was laudable, but it should be noted that testing of theory was not their primary objective.

Another course of action available to the researcher is the setting up of more precisely controlled, small-scale experiments to check particular phases of theories. More exactly, we may say that such experiments check *hypotheses*. A theory implies an interconnected set of hypotheses, each of which can be tested in a separate experiment. The work of Suppes, in testing hypotheses about learning and forgetting rates, is an example of experimentation of this sort. In December 1959 a conference of psychologists was held at the University of California at Los Angeles, chaired by Paul Pimsleur. This conference developed a number of plans for experimentation. Many were based on theory, and some of them have been carried out. I mention the final report of this conference as a source of ideas for research in foreign language teaching.[6]

If research in foreign language teaching is to be really productive, it must become better attuned to theory, both in psychology and in linguistics. Let me point out that neither the audio-lingual habit theory nor the cognitive code-learning theory is closely linked to any contemporary psychological theory of learning. The audio-lingual habit theory has a vague resemblance to an early version of a Thorndikean association theory, while the cognitive code-learning theory is reminiscent of certain contemporary Gestaltist movements in psychology which emphasize the importance of perceiving the "structure" of what is to be learned, without really relying on such movements.

Deficiencies of Foreign Language Learning Theories

Actually, neither theory takes adequate account of an appreciable body of knowledge that has accumulated in the study of verbal learning. Among these facts are the following:

(1) The frequency with which an item is practiced *per se* is not as crucial as the frequency with which it is contrasted with other items with which it may be confused. Thus, the learning of items in "pattern practice" drills would be improved if instead of simple repetition there is a constant alternation among varied patterns.

(2) The more meaningful the material to be learned, the greater is the facility in learning and retention. The audio-lingual habit theory tends to play down meaningfulness in favor of producing automaticity.

(3) Other things being equal, materials presented visually are more easily learned than comparable materials presented aurally. Even though the objective of teaching may be the attainment of mastery over the auditory and spoken components of language learning, an adequate theory of language learning should take account of how the student handles visual counterparts of the auditory elements he is learning, and help to prescribe the optimal utilization of these counterparts, such as printed words, phonetic transcriptions, and other visual symbol systems.

(4) In learning a skill, it is often the case that conscious attention to the critical features of the skill and understanding of them will facilitate learning. This principle is largely ignored by the audio-lingual habit theory; it is recognized by the cognitive code-learning theory. It would imply, for example, that in teaching pronunciation, explanation of necessary articulatory movements would be helpful.

(5) The more kinds of association that are made to an item, the better is learning and retention. Again this principle seems to dictate *against* systems of language teaching that employ mainly one sensory modality, namely hearing. Recently, an experiment done at the Army Language School in Monterey, California[7] seems to show that dramatic facilitation of language learning occurs when words denoting concrete objects and physical actions are associated with actual *motor* performances involving those objects and actions. Thus, the student learns the meaning of the foreign language word for jump by actually jumping! Language teaching becomes a sort of physical exercise both for the

[6] Paul Pimsleur, *Psychological experiments related to second language learning: Report of the NDEA Conference*, Los Angeles: University of California, 1959.

[7] James J. Asher, "Toward a neo-field theory of behavior," *Journal of Humanistic Psychology*, Vol. IV, No. 2 (Fall, 1964), pp. 85–94. Empirical data may be found in S. Kunihira and J. J. Asher, "The new field theory: an application to learning Japanese," *International Review of Applied Linguistics* (in press).

students and for the instructor whose actions they imitate.

These, then, are a few examples of theory-derived principles that, if further examined and verified, could contribute to more effective ways of teaching foreign languages. It would be trite to say at this point that "more research is needed," although it is obviously the case. Actually, what is needed even more than research is a profound rethinking of current theories of foreign language teaching in the light of contemporary advances in psychological and psycholinguistic theory. The audio-lingual habit theory which is so prevalent in American foreign language teaching was, perhaps, fifteen years ago, in step with the state of psychological thinking at that time, but it is no longer abreast of recent developments. It is ripe for major revision, particularly in the direction of joining with it some of the better elements of the cognitive code-learning theory. I would venture to predict that if this can be done, then teaching based on the revised theory will yield a dramatic change in effectiveness.

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